Space Weather Forecast

Issued on Monday, 05 September 2022 at 13:15 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of R1/R2 Radio Blackouts. G1/G2 Minor/Moderate Geomagnetic Storm likely day 1 (5th).

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity was Low with numerous Common-class flares throughout, the largest from the more complex region near the southwest limb. It is now very difficult to assess the magnetic structure of this region due to foreshortening near the limb. There are currently six sunspots on the visible disc. All other remaining spots remain relatively small and simple, with only minor growth. There have been no Earth directed Coronal Mass Ejections (CMEs) seen in satellite imagery over the last 24 hours, although there is still the possibility of a glancing blow today from a CME launched on 2nd September.

Solar Wind / Geomagnetic Activity: The solar wind was indicative of a fast wind from a coronal hole. The wind speed declined from near 700 km/s to around 550 km/s. Total interplanetary magnetic field strength was weak to moderate. The north-south component was largely negative. Geomagnetic activity was mostly G1/Minor to G2/Moderate storm.
Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is at background levels, with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary
Solar Activity: Solar activity is expected to remain largely Low, with an ongoing chance of Moderate flares, mostly from the large region in the southwest. This spot will likely exert influence on the flare risk due to its location until the end of day 3 (7th). New region(s) may rotate onto the east limb on day 1 (5th), potentially increasing the probabilities of significant flares.

Solar Wind / Geomagnetic Activity: The CME that left the Sun on 2nd Sept may give Earth a glance on day 1 (5th). No other Earth-directed CMEs expected. Solar winds will initially be elevated due to a coronal hole fast wind on day 1 (5th), gradually easing to slightly elevated during day 2 (6th), perhaps continuing into day 4 (8th). Further periods of G1/Minor to G2/Moderate Geomagnetic Storms are likely on day 1, with a very slight chance of further G3/Strong (Kp7) Storms. The baseline Geomagnetic activity should begin to reduce to Active to Unsettled with a chance of G1/Minor into day 2, before reducing to mostly Quiet to Unsettled by day 4.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain below the Minor Radiation Storm level (S1). There remains a slight chance of further increases to or above the S1 level, should any significant flares occur from the large sunspot region near the southwest limb

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	**G1 to G2**	Yes	60	30	10	1
Strong	**G3**	No	5	1	1	1
Severe	**G4**	No	1	1	1	1
Extreme	**G5**	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**R1-R2 M Class**	No	40	45	45	45
Very Active	**R3 to R5 X**	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	5	5	5	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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